

REMARKS

Claims 21 to 23, 25, 26, 28 to 31, and 34 to 42 are now pending in the present application. Claims 21 and 30 have been amended. Applicants respectfully submit that the pending claims are patentable for the following reasons.

I. Rejection of Claims 21 to 23, 25, 26, 29 to 31, 37 and 40

Claims 21 to 23, 25, 26, 29 to 31, 37 and 40 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 6,051,503 to “Bhardwaj et al., (“Bhardwaj”) in view of U.S. Patent No. 6,277,173 to Sadakata et al., (“Sadakata”), U.S. Patent No. 5,310,426 to Mori (“Mori”), and Applicants’ allegedly admitted prior art (AAPA). It is respectfully submitted that the combination of Bhardwaj, Sadakata, Mori, and AAPA does not render these claims unpatentable for at least the following reasons.

Claim 21 pertains to a method for anisotropically etching structures into a substrate positioned in an etching chamber. It includes the feature in which *the duration of the passivation steps is set to be shorter than the duration of the etching steps by a factor of 10 to 30*. Although the Office Action alleges that column 10, lines 19 to 22 of Bhardwaj teaches the above-recited claimed feature, the cited section does not support the Office’s contention. Instead, the cited section merely mentions that “ it is desirable to limit the etch and deposition periods to less than 7.5 sec.” (*Bhardwaj*, col. 10, lines 19 to 22.) Accordingly, a duration of the passivation steps set to be shorter than the duration of the etching steps **by a factor of 10 to 30**, as provided in the context of claim 21, is not discussed at all. The secondary Sadakata, Mori and AAPA references do not cure – and are not asserted to cure – this critical deficiency. For at least this reason, claim 21 is allowable.

As further regards claim 21, it recites the following features:

wherein a passivation gas line is *provided upstream from the etching chamber*, a *buffer tank is located along the passivation gas* line upstream from the etching chamber, a *passivation gas valve is located downstream from the buffer tank and upstream from the etching chamber*, and an etching gas line is provided *upstream from the etching chamber*....

It is respectfully submitted that neither the Bhardwaj, Sadakata, Mori, or AAPA reference by itself nor in combination discloses the above identified features. As to cited Figure 1 of Bhardwaj, it does not disclose or suggest a *passivation gas line and an etching gas line*, let alone the passivation gas valve being located *downstream from the buffer tank and upstream from the etching chamber*, as provided in the context of the claimed subject matter. As to cited “col. 51-55” (*Office Action*, page 3), it is respectfully submitted that such columns do not exist.

Still further, claim 21 includes the feature in which *all of the passivation gas **supplied** to the etching chamber passes through the passivation gas line **and the buffer tank***. The Office Action concedes that “Bhardwaj is silent about the use of [a] buffer tank located along the passivation gas line and explicit teaching of filling and emptying of [the] gas tank during passivation steps.” (*Office Action*, page 5.) However, it conclusorily asserts that Sadakata provides the necessary disclosure.

Sadakata pertains to a system and method for discharging gas. (See Sadakata, Abstract). In this regard, Sadakata discusses that it reduces or eliminates **emissions to the atmosphere of global warming**. Any review of the Sadakata makes clear that it does not disclose, or even suggest, *supplying an etching chamber* with a gas which passes through a buffer tank, let alone this gas being a *passivation gas*, as provided in the context of the claimed subject matter. That is because Sadakata is to ***reducing exhaust emissions*** and is unrelated to supplying an etching chamber with a passivation gas. Accordingly, even if Sadakata may mention a buffer tank, it fails to disclose or suggest a buffer tank in which all of the passivation gas supplied to the etching chamber passes through it, as required by the claimed subject matter. Indeed, the Office Action concedes that Sadakata “does not explicitly demonstrate that the process gas to the etching chamber passes through the passivation gas line and the buffer tank. (*Office Action*, page 6.)

As to the Mori reference, its buffer is **after** the reaction chamber and therefore not such where its contents flow ***into the etching chamber***, let alone ***all the passivation gas supplied to the etching chamber passing through the buffer tank***, as required by claim 21. Indeed, cited Figure 4 of Mori provides that any gas into the chamber (1) is from the supply tube (9)

and not from the buffer tank (37). (See *Mori*, column 4, lines 61 to 64, and Fig. 4.) Further, in *Mori*, the reaction chamber (1) is connected to a buffer tank (37) via an **exhaust** pipe (10) and a needle valve (36) or a vacuum tank (35). In this regard, the buffer tank (37) of *Mori* is not filled with a reactant gas that is emptied so as to inject the reactant gas into reaction chamber (1). The contents of buffer tank (37) **are not injected into reaction chamber (1)**. (See *Mori*, Figs. 3 and 4.) Instead, the buffer tank (37) is merely used to stabilize pulsations in the flow of **exhaust gas** caused by rotary pump (39), as well as to dilute exhaust gas from the reaction chamber (1), using purging gas from a purging gas bomb (41), before the exhaust gas is exhausted by rotary pump (39) or treated in a bubbling tank (44) prior to being exhausted. (See *Mori*, column 7, lines 14 to 47.) The AAPA reference does not cure – and is not asserted to cure -- the deficiencies of Bhardwaj, Sadakata, and *Mori* references with respect to at least the above-mentioned feature of claim 21.

In the Response to Arguments section, the Office Action conclusorily asserts that “[o]ne who is skilled in the art at the time of invention should be able to position the buffer tank along the upstream/downstream from [the] etching chamber and fill and empty the buffer tank during [the] passivation step in order to achieve the anisotropic etching of structures.” (*Office Action*, page 11, section 5.) It is respectfully submitted that this assertion is not only completely unsupported, but far-fetched, at best. Indeed, it appears that the Office is not even making a distinction between the buffer being **upstream** or **downstream** from the etching chamber.

In this regard, it is respectfully submitted that obviousness rejections without documentary evidence “should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration.” *MPEP* § 2144.03(A). To the extent the obviousness rejections are maintained, in accordance with *MPEP* § 2144.03(C) and 37 CFR § 1.104(d) (2), it is respectfully submitted that an Examiner’s affidavit should be provided to support the obviousness rejections as to the above cited assertions.

In view of the foregoing, it is respectfully submitted that the combination of Bhardwaj, Sadakata, *Mori*, and AAPA references does not

render claim 21 unpatentable. Accordingly, claim 21, as well as its dependent claims 22, 23, 25, 26, and 29 are allowable.

Claim 30 includes features analogous to claim 21 and is therefore allowable for at least the same reasons. Accordingly, claim 30, as well as its dependent claims 37 and 40 are allowable.

In view of the foregoing, withdrawal of the obviousness rejection for claims 21 to 23, 25, 26, 29 to 31, 37 and 40 is respectfully requested.

II. Rejection of Claim 28

Claim 28 was rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Bhardwaj in view of Sadakata, Mori, AAPA, and U.S. Patent Publication No. 2003/0059720 to Hwang et al., (“Hwang”). It is respectfully submitted that the combination of Bhardwaj, Sadakata, Mori, AAPA, and Hwang references does not render this claim unpatentable for at least the following reasons.

Claim 28 ultimately depends from claim 21 and therefore allowable because the Hwang reference does not cure – and is not asserted to cure – the critical deficiencies of the Bhardwaj, Sadakati, Mori, and AAPA references, as discussed above.

Accordingly, withdrawal of the obviousness rejection for claim 28 is respectfully requested.

III. Rejection of Claims 34 to 36, 41, and 42

Claims 34 to 36, 41, and 42 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Bhardwaj in view of Sadakata, Mori, AAPA, and U.S. Patent No. 6,846,745 to Papasouliotis et al., (“Papasouliotis”). It is respectfully submitted that the combination of Bhardwaj, Sadakata, Mori, AAPA, and Papasouliotis references does not render these claims unpatentable for at least the following reasons.

Claims 34 to 36, 41, and 42 depend from claims 21 and 30 respectively and are therefore allowable because the Papasouliotis reference does not cure – and is not asserted to cure – the critical deficiencies of the Bhardwaj, Sadakata, Mori, and AAPA references, as discussed above.

Accordingly, withdrawal of the obviousness rejections for claims 34 to 36, 41, and 42 is respectfully requested.

IV. Rejection of Claims 38 and 39

Claims 38 and 39 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Bhardwaj in view of Sadakata, Mori, AAPA, and U.S. Patent No. 5,683,548 to Hartig et al., (“Hartig”). It is respectfully submitted that the combination of Bhardwaj, Sadakata, Mori, AAPA, and Hartig references does not render these claims unpatentable for at least the following reasons.

Claims 38 and 39 depend from claim 30 and are therefore allowable for the same reasons because the Hartig reference does not cure – and is not asserted to cure – the critical deficiencies of the Bhardwaj, Sadakata, Mori, and AAPA references, as discussed above.

Accordingly, withdrawal of the obviousness rejections for claims 38 and 39 is respectfully requested.

V. Conclusion

In view of the foregoing, it is respectfully submitted that all pending claims of the present application are now in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.

Respectfully submitted,

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